BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
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NAME	POSITION TITLE
Peter P. Lee, MD	Billy and Audrey L. Wilder Endowed Professor and Chair, Department of Cancer Immunotherapeutics & Tumor Immunology
eRA COMMONS USER NAME (credential, e.g., agency login) Lee.peter	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of California, Los Angeles	B.S.	06/85	Microbiology
University of California, San Diego	M.D.	06/89	Medicine
Scripps Clinic, La Jolla, CA	Internship Residency	1989-1992	Internal Medicine
University of California, San Francisco	Fellowship	1992-1994	Immunology and Allergy
University of California, San Francisco	Research/ Fellowship	1993-1994	Immunogenetics and Transplantation
Stanford University, Stanford, CA	Fellowship	1995-1999	Hematology

A. Personal Statement

Over the past 17 years, my research has focused on understanding the nature, regulation, and dynamics of the human immune system in healthy and cancer patients. My major goal is to translate this understanding into design of novel approaches to modulate the immune response and stroma to control cancer progression and prevent relapse. In recent years, a unique and important approach has been added to complement our experimental methods via the use of bioinformatics, computational modeling, and systems biology to unravel the complex, emergent properties of the immune network. My principal accomplishments include:

1. Showed that the majority of melanoma patients mount an endogenous T cell response against their tumors, but these T cells were dysfunctional, 1999. This has since been replicated by many groups in all human cancer types examined.
2. Showed that T cell responses to cancer are strongly dependent on their recognition efficiency for tumor-associated antigen peptides for efficacy, 2004.
3. Demonstrated significant changes in immune cell populations in tumor-draining lymph nodes in breast cancer patients – such changes strongly predict clinical outcome, 2005 – present.
4. Demonstrated a defect in the interferon signaling pathways in lymphocytes from patients with several cancer types, 2007 – present.
5. Began utilizing mathematical modeling and computer simulations to understand immune responses on multiple scales, including molecular and cellular interactions, 2005 – present.
6. Demonstrated a host anti-leukemia T cell response against chronic myelogenous leukemia in patients after targeted molecular therapy, and through mathematical modeling proposed a novel vaccination approach that may potentially eradicate residual leukemia, 2008 – present.

B. Positions, Honors

POSITIONS

1992-1994 Fellowship, Clinical Immunology and Allergy, University of California, San Francisco, San Francisco, CA.
1993-1994 Fellowship, Immunogenetics and Transplantation, University of California, San Francisco, San Francisco, CA.
1995-1999 Fellowship, Hematology, Stanford University, Stanford, CA.
1999-2006 Assistant Professor of Medicine (Hematology), Stanford University, Stanford, CA.
2006-2011 Associate Professor of Medicine (with tenure), Stanford University, Stanford, CA.

2011-2013 Professor and Associate Chair, Cancer Immunotherapeutics and Tumor Immunology, Beckman Research Institute, City of Hope, Duarte, CA
2011-present Attending Physician in Hematology, City of Hope Comprehensive Cancer Center
2013-present Billy and Audrey L. Wilder Endowed Professor
2013-present Chair, Cancer Immunotherapeutics and Tumor Immunology, Beckman Research Institute, City of Hope, Duarte, CA

AWARDS & HONORS (Selected)

1985 Magna Cum Laude, Departmental Honors, Phi Beta Kappa - UCLA
1992 Gordon Shultz Award for Outstanding Research
1994 Outstanding Young Investigator, World Transplantation Society
2001 Stanford Medical School Excellence in Teaching
2001-4 Damon Runyon Scholar Award (Connie and Bob Lurie Scholar)
2003-7 American Cancer Society Research Scholar
2006 Elected member, American Society for Clinical Investigation
2006-11 Dept. of Defense Era of Hope Scholar Award for Breast Cancer Research
2012-16 Dept. of Defense Multi-Team Award for Breast Cancer Research
2012-17 Dept. of Defense Era of Hope Expansion Award for Breast Cancer Research

C. Selected Peer-reviewed Publications

1. **Lee PP**, Yee C, Savage PA, Fong L, Brockstedt D, Weber JS, Johnson D, Swetter S, Thompson J, Greenberg PD, Roederer M, and Davis MM. Characterization of circulating T cells specific for tumor-associated antigens in melanoma patients. Nature Medicine, 5(6):677-685, 1999.
2. Molldrem JJ, **Lee PP**, Kant S, Wieder E, Jiang W, Lu S, Wang C, and Davis MM. Chronic Myelogenous Leukemia Shapes Host Immunity by Selective Deletion of High Avidity Leukemia-Specific T Cells. Journal of Clinical Investigation 111:639-647, 2003. PMCID: PMC151894
3. Rubio V, Stuge T, Singh N, Betts M, Weber J, Roederer M, and **Lee PP**. Ex Vivo Identification, Isolation, and Analysis of Tumor-Cytolytic T cells. Nature Medicine 9(11):1377-1382, 2003.
4. Xu T, Shu CT, Purdom E, Dang D, Ilsley D, Guo Y, Weber J, Holmes SP, **Lee PP**. Microarray analysis reveals differences in gene expression of circulating CD8(+) T cells in melanoma patients and healthy donors. Cancer Res. 64(10):3661-7, 2004.
5. Stuge TB, Holmes SP, Saharan S, Tuettenberg A, Roederer M, Weber J, and **Lee PP**. Diversity and Recognition Efficiency of T Cell Responses to Cancer. PLoS Med 1(2): e28, 2004. PMCID: PMC529423
6. Holmes SP, He M, Xu T, and **Lee PP**. Lineage relationships in CD8 T cells revealed by microarray analysis. Proc Natl Acad Sci U S A 102(15):5519-23, 2005.
7. Kohrt HB, Nouri N, Nowels K, Johnson D, Holmes SP, and **Lee PP**. Profile of Immune Cells in Axillary Lymph Nodes Predicts Disease-free Survival in Breast Cancer. PLoS Med. 2(9):e284, 2005. PMCID: PMC1198041
8. Critchley-Thorne RJ, Yan N, Nacu S, Weber J, Holmes SP, and **Lee PP**. Down-regulation of the interferon signaling pathway in T lymphocytes from patients with metastatic melanoma. PLoS Med 4(5):e176, 2007. PMCID: PMC1865558
9. Chen CI, Maecker HT, **Lee PP**. Development and dynamics of robust T-cell responses to CML under imatinib treatment. Blood 2008 Jun 1;111(11):5342-9. PMCID: PMC2396727
10. Critchley-Thorne RJ, Simons DL, Yan N, Miyahira AK, Dirbas FM, Johnson DL, Swetter SM, Carlson RW, Fisher GA, Koong A, Holmes S, **Lee PP**. Impaired interferon signaling is a common immune defect in human cancer. Proc Natl Acad Sci U S A. 2009 Jun 2;106(22):9010-5. PMCID: PMC2690021
11. Simons DL, Lee G, Kirkwood JM, **Lee PP**. Interferon signaling patterns in peripheral blood lymphocytes may predict clinical outcome after high-dose interferon therapy in melanoma patients. J Transl Med. 2011 May 5;9:52. PMCID: PMC3114759
12. Zuckerman NS, Yu H, Simons DL, Bhattacharya N, Carcamo-Cavazos V, Yan N, Dirbas FM, Johnson DL, Schwartz EJ, and **Lee PP**. Altered local and systemic immune profiles underlie lymph node metastasis in breast cancer patients. Int J Cancer 2012 Nov 8. doi: 10.1002/ijc.27933. PMCID: PMC3609917, NIHMS423488
13. Yu HX, Simons DL, Carcamo-Cavazos V, Schwartz EJ, Yan N, Zuckerman N, Segal I, Dirbas FM, Johnson DL, Holmes SP, and **Lee PP**. PRC2/EED-EZH2 Complex Is Up-regulated in Breast Cancer Lymph Node

Metastasis Compared to Primary Tumor and Correlates with Tumor Proliferation In Situ. PLoS ONE 2012;7(12):e51239. PMCID: PMC3519681
14. Zuckerman NS, Noam Y, Goldsmith AJ, and **Lee PP**. A self-directed method for cell-type identification and separation of gene expression microarrays. PLoS Comp Biol, 2013 Aug;9(8):e1003189. doi: 10.1371/journal.pcbi.1003189. Epub 2013 Aug 22. PMID: 23990767
15. Chang AY, Bhattacharya N, Mu J, Setiadi AF, Carcamo-Cavazos V, Lee GH, Simons DL, Yadegarynia S, Hemati K, Kapelner A, Ming Z, Krag DN, Schwartz EJ, Chen DZ, and **Lee PP**. Spatial organization of dendritic cells within tumor draining lymph nodes impacts clinical outcome in breast cancer patients. J Transl Med. 2013 Oct 2;11(1):242. PMID: 24088396

D. Research Support

Ongoing

W81XWH-11-1-0548 (Lee) 04/01/12 – 09/24/16
DOD
Enhancing the Breadth and Efficacy of Therapeutic Vaccines for Breast Cancer
This proposal will support the development of a portfolio of immunologically validated antigens for the major breast cancer subtypes, and agents that will enhance the induction of apoptosis in tumor cells that synergize with T cell mediated killing.
Role: PI

W81XWH-12-1-0366 BC112729 Era of Hope (Lee) 09/30/12 – 08/31/17
DOD
Integrated Immunotherapy for Breast Cancer
Integrated immunotherapy that counteracts cancer-induced immune dysfunction *in vivo* by targeting multiple phases of the immune response will be more effective than the individual immunotherapies currnrly being developed.
Role: PI

R01 CA127947 (Lee) 07/01/07 – 04/30/14 (NCE)
NIH/NCI
Immune Profile Analysis of Tumor-Draining Lymph Nodes in Breast Cancer
This grant supports the analysis of T, B, and dendritic cell populations within tumor-draining lymph nodes in breast cancer patients and the development of a prognostic tool based on such analysis.
Role: PI

R01 CA130817 (Lee) 01/01/08 – 12/31/13 (NCE)
NIH/NCI
Interplay Between Cancer and Immune Cells on Targeted Therapy
This grant supports the analysis of anti-leukemia immune responses and the mathematical modeling of these data to gain mechanistic insights.
Role: PI

Completed Research

W81XWH-06-1-0417, Lee (P.I.) 03/01/06 - 02/28/12
Dept. of Defense
Immunology, Systems Biology, and Immunotherapy of Breast Cancer
This grant supports mechanistic studies of the immune responses in breast cancer patients using systems biology approaches and computational modeling.
Role: P.I.